

## **JET Meeting Minutes**

### **May 17, 2016**

#### **Participants**

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#### **Action Items - New**

1. If you have SCinet connectivity needs not listed contact [Jim Stewart](mailto:jimstewart@northwestern.edu)

#### **Action Items - Carry forward**

1. Jennifer Schopf will inform the JET members of her inexpensive deployments of perfSONAR on ACE. (Scheduled for June meeting.)

#### **Proceedings**

This meeting of the JET was coordinated by Grant Miller and Paul Love of the NCO.

#### **Network & IX Round tables**

##### **CAAREN: Andrew Gallo**

CAAREN is awaiting receipt of the last equipment needed to support the CAAREN expansion to 100G. CAAREN is beginning a refresh of their presence at Equinox in McLean.

##### **ESnet: Inder Monga**

ESnet is starting the design and architecture of ESnet 6. It is approximately 2 years to implementation of this new network. The next year is dedicated to trying out new architectures followed by implementation of the network. The ESnet hardware

refresh is going well. Security is a focus topic for ESnet. They are partnering with CENIC and had an initial day discussion with them at a one-day offsite.

**NASA (Earth Sciences) networking: Kevin Kranacs**

The NASA Earth Science mission networking is being upgraded to 100G to the MAX. NASA is building a 40G TICAP implementing the Einstein3.

**NOAA: Rob Sears**

NOAA has 100G connectivity to the R&E community at the MAX. NOAA is building a community TICAP in the DC area. It is split between McLean and College Park where there is community connectivity. This geographic diversity offers increased accessibility and high availability. The Hawaii and Seattle TICAPs are completed. The Dallas TICAP is completed but unused. The TICAPs offer layered services, Einstein box functionality and TICAP 2.0 compliance.

**PacificWave: Jonah Keough**

PacWave has operationalized 100G links. TransPAC offers SINET backup to their Asian links. PacWave recently expanded its node sites with 2 sites in Tokyo and U.S. nodes in El Paso, Denver, and Albuquerque.

**TransPac: Jennifer Schopf (via email)**

The 10G LA Tokyo link is being decommissioned at the end of May, all traffic is being shifted to the 100G link. The 100G TransPAC-PacWave link is up and running and stable.

TransPac will be putting out an RFP for a circuit between Guam and Tokyo or Hong Kong in the next 2 months.

**ACE: Jennifer Schopf (via email)**

ACE funding has been extended to the end of the calendar year. The 30G lag from WIX to Frankfurt will continue to carry traffic until that time. ACE has applied for follow-on funding from NSF but hasn't heard back yet (and doesn't expect to for several months).

**US Ignite: Glenn Ricart**

There is a June 13-15 meeting on Smart Cities in Austin, TX. Twelve cities have been funded by the NSF and an additional 3 cities have self-funded. Connectivity is based on Juniper QFX5s. The cities interconnect all the 1G "bits" using 10G connections; some will connect at 40G; both are acceptable. They can't use AS numbers since not city specific so they may have to use a long list of prefix numbers. The first city digital town square will be Champagne-Urbana. Salt Lake City is already connected. They are creating new peering points – all downstream which keeps traffic local.

**Internet2: Tad Reynales/Stephen Wolff**

Nothing to report

**OSU networking: Tony Brock**

They are a MPLS network. They have recently been directed to expand coverage to new locations at the campuses in Bend and Newport. Bend will be done sooner,

Newport within 2 years. Current campus networks are currently based on Cisco 6500s which they are looking to replace – perhaps with Juniper QFXs. Their connection to Internet2 is 20G with 100G road mapped.

**StarLight: Joe Mambretti**

StarLight had a discussion with members of the SCinet WAN team while all were in Chicago. StarLight is planning a large number of big data demonstrations for SC16.

StarLight is building out 2 SDXs, one under GENI in coordination with Russ Clark in Atlanta, the other with support from the NSF IRNC. Other SDXs include PacificWave and the Pacific Northwest GigaPoP, LA, Sunnyvale, and Seattle. Tom Lehman has deployed a self-funded SDX at the MAX. Jeronimo Bezerra has an SDX at Florida International University (FIU). Joe Mambretti is supporting a number of specialty applications. The SDXs connect heterogeneous islands with segmentation so it looks like a private exchange for the applications. The BioInformatics SDX is a prototype and will be demonstrated at SC16 including connectivity with Taiwan and Singapore over 100G trans-Pacific links.

**UEN: Jim Stewart**

In addition to higher ed, Utah is providing connections for K-12 and library applications. 1494 sites are connected via fiber. Six remote sites are being connected by 270 miles of fiber for \$10 million. EduRoam will provide authentication for all UEN sites. They are working with US Ignite for potential participation to support communities in Utah. They are working on a wider role for WiFi at the schools, Internet and LAN support. Security and filtering are critical issues. They are using Arbor Networks to mitigate DDOS. They are active in the Quilt community

**Los Nettos: Celeste Anderson**

Los Nettos has 100G connectivity to both CENIC and PacWave. They are upgrading their Science DMZ using donated hardware and trying not to disturb current users in the process. They are implementing an SDX testbed (4 members.) They hold a call twice a month to share data on OpenFlow/SDN hardware. They have an educational demonstration of a USC microscope with 5k video data.

**AARNET: David Wilde**

The 2 x40G connections from Australia to the US are being upgraded to 100G. The path to Seattle has been upgraded. The second link, to Los Angeles, will be upgraded next month. They are planning to upgrade their Asian links to Singapore, Hong Kong, and Guam.

AARNET is running an SDN/SDX testbed with nodes in Perth, Sydney, Melbourne, and Seattle. Ten universities are connected to this testbed. They are connected to AmLight and have demonstrated functionality with Jeronimo Bezerra. AARNET has deployed SDN in some of their own offices. They are using OpenFlow 1.3 on Nova switches for the SDN testbed.

AARNET is using visualization of netflow data to display traffic flows, data flows, and movement through the DMZ. A cloud based dropbox allows data to be shared with other researchers. AARNET is using 100G perfSONAR appliances

**SCinet: Jim Stewart**

SCinet is looking for user requirements for connectivity to SC16. The current expectations for connectivity include:

- 1 x 100G to Florida
- 3 x 100G to DC
- 2 x 100G to Europe through MANLAN
- 5 x 100G to Chicago
- 4 x 100G to Seattle
- 4 x 100G to LA
- 1 x 100G St. George, UT
- 1 x 100G U of Utah
- ESnet links
- Internet2 links

AI: If you have SCinet connectivity needs not listed contact [Jim Stewart](#)

It was noted that StarLight brought in 2 x 100G to the Global Summit Hotel with no problems. Ten years ago, at the previous Internet2 meeting in Chicago, 2 x 10G was brought into McCormick Place over private fiber after 6 months of work.

**AmLight/FIU: Jeronimo Bezerra**

Jeronimo is supporting the LSST with a 100G link from AmLight to Sao Paulo. The LSST 2 x 10G connectivity is being upgraded to 100G. The 100G connection to Sao Paulo required a lot of troubleshooting (lots of cleaning!) The 2<sup>nd</sup> 100G link to AmLight will be up the west coast of South America to provide a diverse path 100G ring. Panama is being upgraded from 1G to 2 x 1G to 100G next year. They will use OpenWave with an alien wave to support the 100G link. They are in discussions with Google on a new cable to Brazil in which they expect to have a fractional ownership.

For SC16 RNP will interconnect and integrate their SDX. Prior to SC this will first be shown at TechX in Sept.

RNP is upgrading their network to OpenFlow which will require large buffers due to distance/latency issues.

**Pacific Northwest GigaPoP: Jonah Keough**

Nothing new to report

**AS7512-32X Series Switch by Edge-Core: Bill Chimiak**

Bill Chimiak described a very cost-effective bare metal switch infrastructure for data center fabric that is deployed as a Top-of-Rack switch supporting 10 or 25GbE to servers, with 40, 50, or 100GbE uplinks. It has 32 X QSFP28 switch ports each supporting 1 x 100GbE or 1 x 40GbE. It supports Layer 2 or 3 forwarding of 6.4 Tbps.

It is not available until next GA release 2.7.1 code expected June 2016 for \$3119.22 with an \$800 discount for their Spring Break Out Promotional Pricing valid until June 2016.

There is a 1 Year Standard Maintenance and Support for P-OS-100G-Bundle for \$800 with an \$80 discount.

**Meetings of Interest:**

May 31-June 1        [NIST NDN Workshop](#), Gaithersburg, MD  
June 12-16        [TNC16](#), Prague, Czech Republic  
June 13-15        [NANOG67](#), Chicago, IL  
June 13-15        [Smart Community Week](#), Austin, TX  
July 17-22        [IETF 96](#), Berlin, Germany  
July 31 - August 5    [APAN42](#), Hong Kong  
September 25-28    [TechX](#), Miami, FL  
September 29-30    [GLIF16](#), Miami, FL  
October 17-19       [CANS2016](#), Houston, TX  
October 17-19       [NANOG68](#), Dallas, TX  
October 18-21       [ESCC/Quilt/NSF PIs](#), Philadelphia, PA  
October 20-21       [ARIN 38](#), Dallas, TX  
November 13-18     [IETF 97](#), Seoul, South Korea  
November 13-18     [SC16](#), Salt Lake City, UT

**Next JET Meetings:**

June 21        12:00-2:00 EDT, NSF  
July 19        12:00-2:00 EDT, NSF

**Planning for future JET meetings:**

September 25-28    JET at TechX, Miami, FL  
November 13-18    JET at SC16, Salt Lake city, UT